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DELAWARE LEVEL 1 INTERCONNECTION APPLICATION/AGREEMENT

With Terms and Conditions for Interconnection
(Lab Certified Inverter-Based Small Generator Facilities Less than or Equal to 10 kW)

The Green Power Connection™ Team
Delmarva Power
A PHI Company
(866) 634-5571 - Phone
gpc-north@pepcoholdings.com

(Send applications via Email or Mail to Delmarva Power, GPC Team)

Mailing Address: 5 Collins Drive, Mail Stop 84CP22, Carneys Point, NJ 08069

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PART 1

DELAWARE LEVEL 1 INTERCONNECTION APPLICATION & AGREEMENT

With Terms and Conditions for Interconnection
(Lab Certified Inverter-Based Small Generator Facilities Less than or Equal to 10 kW)

(Application & Conditional Agreement – to be completed prior to installation)

INTERCONNECTION CUSTOMER CONTACT INFORMATION

Customer Name: Harry P Hallock

Mailing Address: 33145 W Batten St

City: Lewes State: DE Zip Code: 19958

Contact Person/Authorized Agent (If other than above): _____

Mailing Address (If other than above): _____

Telephone (Daytime): 586-216-8042 (Evening): _____

Fax Number: _____ E-Mail Address (Required): hph312@gmail.com

Alternate Project Contact Information: (if different from Customer-Generator above)

Alternate Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Fax Number: _____ E-Mail Address: _____

If an email is provided for your alternate contact, that contact will receive all email communications.

FACILITY INFORMATION

Facility Address: 33145 W Batten St # LT2

City: Lewes State: DE Zip Code: 19958

DPL Account #: 5000 0747 480 Meter #: 1ND342617066

Current Annual Energy Consumption (optional): 7800 kWh

Check if this Facility (building) is, or is going to be, NEW CONSTRUCTION: ☐

Estimated Commissioning Date: 12/1/17

Energy Source: Solar PV Prime Mover: Photovoltaics

Type of Application: Initial ☒ Addition/Upgrade ☐ [1]

Initial Rating: DC Generator Total[2] Nameplate Rating: 6.96 (kW),
AC Inverter Total[3] Rating 6 (kW),
AC System Design Total Capacity[4]: 6 (kW) 6000 (kVA)

Added Rating (if upgrade): DC Generator Total Nameplate Rating: _____ (kW),
AC Inverter Total Rating _____ (kW),
AC System Design Total Capacity: _____ (kW) ____ (kVA)

Total Rating (if upgrade): DC Generator Total Nameplate Rating: _____ (kW),
AC Inverter Total Rating _____ (kW),
AC System Design Total Capacity: _____ (kW) ____ (kVA)

Generator (or PV Panel) Manufacturer, Model #[5]: SolarWorld 290w MONO BLACK

A copy of Generator nameplate and Manufacturer's Specification Sheet may also be submitted

Number of Generators (or PV Panels): 24

Type of Tracking if PV: Fixed ☒ Single Axis ☐ Double Axis ☐

Array Azimuth if PV: 227 ° Array Tilt if PV: 27 °

Shading Angles if PV at E, 120°,150°,S,210°,240°,W: _____ ° (Separate with comas)

Inverter Manufacturer[6]: Fronius Model Number(s) of Inverter[7]: PRIMO 6.0

Number of Inverters[8]: 1 Inverter Type: Forced Commutated ☐ Line Commutated ☒

Ampere Rating: 25 $Amps_{AC}$, Number of Phases: ☒ 1 ☐ 3

Nominal Voltage Rating: 240 V_{AC}, Nominal DC Voltage: 386 V_{DC},

Power Factor: 100 %, Frequency: 60 Hz, Efficiency: 96 (%)

DPL Taggable, Lockable, Accessible Disconnect[9]: ☐ Yes ☐ No,

If Yes, Location: _____

One-line Diagram Attached (Required): ☒ Yes ☐ No,

Site Plan Attached (Required): ☐ Yes ☐ No

Do you plan to export power?[10] ☒ Yes ☐ No, If Yes, Estimated Maximum: 5 kW_{AC}

Estimated Gross Annual Energy Production: 8580 kWh

Is the inverter IEEE/UL1741 lab certified? Yes ☒ No ☐
(If yes, attach manufacturer's cut sheet showing listing and label information from the appropriate listing authority, e.g. UL 1741 listing. If no, facility is not eligible for Level 1 Application.)

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[1] Initial if first time generator request. Addition/Upgrade if this is an add-on to a previously approved system.
[2] Sum of all generators or PV Panels
[3] Sum of all inverters
[4] This will be your system design capacity based upon your unique system variables.
[5] If more than one type, please list all manufactures and model numbers.
[6] If more than one manufacture, please list all.
[7] If more than one model number, please list all.
[8] Attach additional sheets as necessary in the event of multiple inverters of various types/sizes
[9] This is strongly recommended by the utility. Best practice is to have an externally accessible, lockable, disconnect with visible open/close connection and to have appropriate signage on the disconnect, such as 'Solar PV AC Disconnect' (preferably red) and on the meter housing 'Caution, Solar Electric System'" (preferably yellow). If the disconnect is not in the immediate vicinity of the meter, please include the disconnect location on the meter signage. This enables the utility and first responders to more quickly deal with an emergency situation.
[10] Yes, if your expected maximum output of the inverter (kW AC) is greater than the lowest load you anticipate at your facility during maximum PV output (kW). The difference would be the amount you may export.

EQUIPMENT INSTALLATION CONTRACTOR

Owner (Customer) Installed: ■ Yes ☐ No

Contractor Name: Alutech United Inc

Mailing Address: 117 Dixon St

City: Selbyville State: DE Zip Code: 19975

Telephone (Daytime): 800-233-1144 (Evening): 302-841-9059

Fax Number: 302-436-5100 E-Mail Address (Required): Haleigh@greenstreetsolar.com

ELECTRICAL CONTRACTOR

Electrical Contractor Name: Alutech United Inc

Mailing Address: 117 Dixon St

City: Selbyville State: DE Zip Code: 19975

Telephone (Daytime): 800-233-1144 (Evening): 302-436-5100

Fax Number: 302-436-5100 E-Mail Address: Russell@greenstreetsolar.com

License number: T1-0005686 Active License? Yes ■ No ☐

Is small generator facility eligible for Net Metering? Yes ■ No ☐

INSURANCE DISCLOSURE

The attached terms and conditions contain provisions related to liability and indemnification, and should be carefully considered by the interconnection customer. The interconnection customer is not required to obtain general liability insurance coverage as a precondition for interconnection approval; however, the interconnection customer is advised to consider obtaining appropriate insurance coverage to cover the interconnection customer's potential liability under this agreement.

CUSTOMER SIGNATURE

I hereby certify that: 1) I have read and understand the terms and conditions which are attached hereto by reference and are a part of this Agreement; 2) I hereby agree to comply with the attached terms and conditions; and 3) to the best of my knowledge, all of the information provided in this application request form is complete and true. I consent to permit the PSC and interconnecting utility to exchange information regarding the generating system to which this application applies.

Interconnection Customer Signature: Harry P. Hallock Date: 9/26/17

Printed Name: Harry Hallock Title: Homeowner

Conditional Agreement to Interconnect Small Generator Facility *(for EDC use only)*

Receipt of the application fee is acknowledged and, by its signature below, the EDC has determined the interconnection request is complete. Interconnection of the small generator facility is conditionally approved contingent upon the attached terms and conditions of this Agreement the return of the attached Certificate of Completion duly executed, verification of electrical inspection and successful witness test or EDC waiver thereof.

EDC Signature: _____ Date: _____

Printed Name: _____ Title: _____

Level 1 Interconnection Agreement

Terms and Conditions for Delaware Interconnection

(Lab Certified Inverter-Based Small Generator Facilities Less than or Equal to 10 kW)

1) **Construction of the Small Generator Facility**. The Interconnection Customer may proceed to construct (including operational testing not to exceed 2 hours) the Small Generator Facility once the Conditional Agreement to Interconnect a Small Generator Facility on the preceding page has been signed by the EDC.

2) **Final Interconnection and Operation.** The Interconnection Customer may operate the Small Generator Facility and interconnect with the EDC's Electric Distribution System after all of the following have occurred:
   a) Electrical Inspection: Upon completing construction, the Interconnection Customer will cause the Small Generator Facility to be inspected by the local electrical wiring inspector with jurisdiction who shall establish that the Small Generator Facility meets the requirements of the National Electrical Code.
   b) Certificate of Completion: The Interconnection Customer shall provide the EDC with a completed copy of the Interconnection Agreement Certificate of Completion, including evidence of the electrical inspection performed by the local authority having jurisdiction. The evidence of completion of the electrical inspection may be provided on inspection forms used by local inspecting authorities. The Interconnection request shall not be finally approved until the EDC's representative signs the Interconnection Agreement Certificate of Completion.
   c) EDC has either waived the right to a Witness Test in the Interconnection Request, or completed its Witness Test as per the following:
      i) Within five (5) business days of the estimated commissioning date, the EDC may, upon reasonable notice and at a mutually convenient time, conduct a Witness Test of the Small Generator Facility to ensure that all equipment has been appropriately installed and that all electrical connections have been made in accordance with applicable codes;
      ii) If the EDC does not perform the Witness Test within the 5-day period or such other time as is mutually agreed to by the parties, the Witness Test is deemed waived.

3) **IEEE 1547**. The Small Generator Facility is installed operated and tested in accordance with the requirements of IEEE standard 1547, "Standard for Interconnecting Distributed Resources with Electric Power Systems", as amended and supplemented, at the time the interconnection request is submitted.

4) **Access.** The EDC shall have direct, unabated access to the disconnect switch and metering equipment of the Small Generator Facility at all times. The EDC shall provide reasonable notice to the customer when possible prior to using its right of access.

5) **Metering.** Any required metering shall be installed pursuant to appropriate tariffs and tested by the EDC pursuant to the EDC's meter testing requirements pursuant to the Code of Delaware Regulations, Title 26 - Public Utilities – Chapter 10. Electric Utility Restructuring §1014.

6) **Disconnection.** The EDC may temporarily disconnect the Small Generator Facility upon the following conditions:
   a) For scheduled outages upon reasonable notice;
   b) For unscheduled outages or emergency conditions;

c) If the Small Generator Facility does not operate in the manner consistent with this Agreement;
d) Improper installation or failure to pass the Witness Test;
e) If the Small Generator Facility is creating a safety, reliability or a power quality problem; or
f) The Interconnection Equipment used by the Small Generator Facility is de-listed by the Nationally Recognized Testing Laboratory that provided the listing at the time the interconnection was approved.

7) **Indemnification**. The parties shall at all times indemnify, defend, and save the other party harmless from any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other party's performance or failure to perform under this Agreement on behalf of the indemnifying party, except in cases of gross negligence or intentional wrongdoing by the indemnified party.

8) **Limitation of Liability**. Each party's liability to the other party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either party be liable to the other party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever.

9) **Termination**. This Agreement may be terminated under the following conditions:
a) By Interconnection Customer - The Interconnection Customer may terminate this application agreement by providing written notice to the EDC.
b) By the EDC - The EDC may terminate this Agreement if the Interconnection Customer fails to remedy a violation of terms of this Agreement within 30 calendar days after notice, or such other date as may be mutually agreed to prior to the expiration of the 30 calendar day remedy period. The termination date can be no less than 30 calendar days after the Interconnection Customer receives notice of its violation from the EDC.

10) **Modification of Small Generator Facility**. The Interconnection Customer must receive written authorization from the EDC before making any changes to the Small Generator Facility, other than minor changes that do not have a significant impact on safety or reliability of the Electric Distribution System as determined by the EDC. If the Interconnection Customer makes such modifications without the EDC's prior written authorization, the EDC shall have the right to temporarily disconnect the Small Generator Facility.

11) **Permanent Disconnection.** In the event the Agreement is terminated, the EDC shall have the right to disconnect its facilities or direct the customer to disconnect its Small Generator Facility.

12) **Disputes.** Each party agrees to attempt to resolve all disputes regarding the provisions of these interconnection procedures pursuant to the dispute resolution provisions of the Delaware Standard Small Generator Interconnection Rules, Title 26 - Public Utilities – Chapter 10. Electric Utility Restructuring §1014.

13) **Governing Law, Regulatory Authority, and Rules.** The validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the State of Delaware. Nothing in this Agreement is intended to affect any other agreement between the EDC and the Interconnection Customer. However, in the event that the provisions of this agreement are in conflict with the provisions of the EDC's tariff, the EDC tariff shall control.

14) **Survival Rights**. This Agreement shall continue in effect after termination to the extent necessary to allow or require either party to fulfill rights or obligations that arose under the Agreement.

15) **Assignment/Transfer of Ownership of the Small Generator Facility.** This Agreement shall terminate upon the transfer of ownership of the Small Generator Facility to a new Eligible Customer Generator (owner or tenant), unless the new Eligible Customer Generator notifies the EDC of the change, their agreement to abide by the Terms and Conditions of the original Interconnection Agreement, and so notifies the EDC in writing prior to or coincident with the transfer of electric service to the new customer. Should an interconnection agreement terminate for failure of a new customer to provide appropriate written agreement within 30 days, the EDC shall notify the Public Service Commission the Interconnection Agreement has been terminated.

16) **Definitions**. Any capitalized term used herein and not defined shall have the same meaning as the defined terms used in the Delaware Standard Small Generator Interconnection Rule, Title 26 - Public Utilities – Chapter 10. Electric Utility Restructuring §1014.

17) **Notice**. Unless otherwise provided in this Agreement, any written notice, demand, or request required or authorized in connection with this Agreement ("Notice") shall be deemed properly given if delivered in person, delivered by recognized national courier service, or sent by first class mail, postage prepaid, to the person specified below:

18) **Important Note.** Running grid-tied generation at a premise will generally raise voltage levels. A proper voltage drop/rise study must be done to insure that resulting voltages do not cause problems at the customer premise and/or to the operation of the inverter. If there are times when generator output will exceed the load of the premise, this will cause voltage rise across the line transformer and service line to the facility. Be sure this is taken into account when doing a voltage drop/rise analysis. If there are other customers that have grid-tied solar and their premise is fed by the same line transformer, be sure to take that into account when considering voltage rise across the line transformer. If the new generation system causes high voltage for other customers fed by the same transformer, it will be the responsibility of the newest generator installation to remediate the high voltage. The normal voltage at the meter without generation is 120 V +/- 5% (or other secondary voltages such as 208, 240, 480, etc.). Be sure to assume the highest voltage (+ 5%) at the meter when doing the voltage drop/rise analysis to insure acceptable voltage at the premise and at the inverter. **The utility is not responsible for elevated voltage caused by the operation of a generator.** The electrical grid has been designed to maintain 120 V +/- 5% (or other standard secondary voltages) during the course of the normal load cycle.

If to Interconnection Customer:

Use the contact information provided in the Agreement for the Interconnection Customer. The Interconnection Customer is responsible for notifying the EDC of any change in the contact party information, including change of ownership.

If to EDC:

Use the contact information provided on the EDC's web page for small generator interconnection.

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PART 2

DELAWARE INTERCONNECTION APPLICATION & AGREEMENT

With Terms and Conditions for Interconnection
(Lab Certified Inverter-Based Small Generator Facilities Less than or Equal to 10 kW)

(Final Agreement – must be completed after installation and prior to interconnection)

Certificate of Completion[11]

INTERCONNECTION CUSTOMER CONTACT INFORMATION

Customer Name: Harry Hallock

Mailing Address: 33145 W Batten St

City: Lewes State: DE Zip Code: 19958

Telephone (Daytime): 586 216-4042 (Evening): _____

Fax Number: _____ E-Mail Address: hph312@gmail.com

FACILITY INFORMATION

Facility Address: 33145 W Batten St #LT2

City: Lewes State: DE Zip Code: _____

DPL Account #: 5000 0747 480 Meter #: 1ND342617066

Energy Source: Solar PV Prime Mover: Photovoltaics

Inverter Type: Forced Commutated ☐ Line Commutated ■

Number of Inverters: 1

Inverter Manufacturer: Fronius Model Number(s) of Inverter: PRIMO 6.0

Rating

DC Generator Total[12] Nameplate Rating: 6.96 (kW),
AC Inverter Total[13] Rating 6 (kW),
AC System Design Total Capacity[14]: 6 (kW) 6000 (kVA)

Generator (or PV Panel) Manufacturer, Model #[15]: SolarWorld 290w MONO BLACK

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[11] Information entered here on Certificate of Completion (Part 2) must match part 1
[12] Sum of all generators or PV Panels
[13] Sum of all inverters
[14] This will be your system design capacity based upon your unique system variables.
[15] If more than one type, please list all manufactures and model numbers.

EQUIPMENT INSTALLATION CONTRACTOR Owner (Customer) Installed: ☐ Yes ☒ No

Contractor Name: Alutech United Inc

Mailing Address: 117 Dixon St

City: Selbyville State: DE Zip Code: 19975

Telephone (Daytime): 800-233-1144 (Evening): 302-841-9059

Fax Number: 302-436-5100 E-Mail Address: Haleigh@greenstreetsolar.com

FINAL ELECTRIC INSPECTION AND INTERCONNECTION CUSTOMER SIGNATURE

The Small Generator Facility is complete and has been approved by the local electric inspector having jurisdiction. A signed copy of the electric inspector's form indicating final approval is attached. The Interconnection Customer acknowledges that it shall not operate the Small Generator Facility until receipt of the final acceptance and approval by the EDC as provided below.

Signed: Harry P. Hallock Date 11/10/2017

(Signature of interconnection customer)

Printed Name: Harry Hallock

Check if copy of signed electric inspection form is attached ☒

.....

ACCEPTANCE AND FINAL APPROVAL FOR INTERCONNECTION ***(for EDC use only)***

The interconnection agreement is approved and the Small Generator Facility is approved for interconnected operation upon the signing and return of this Certificate of Completion by EDC:

Electric Distribution Company waives Witness Test? *(Initial)* Yes (JC) No (_____)

If not waived, date of successful Witness Test: _____ Passed: *(Initial)* (_____)

EDC Signature: Julianny Carvalho Digitally signed by Julianny Carvalho DN: cn=Julianny Carvalho, o, ou=GPC, email=Jcarvalho@pepco.com, c=US Date: 2017.11.21 06:46:55 -05'00' Date: 11/21/2017

Printed Name: Julianny Carvalho Title: Account Coordinator

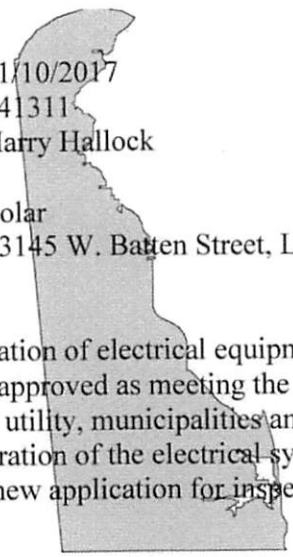
First State Inspection Agency, Inc.
1001 Mattlind Way
Milford, DE 19963

1-800-468-7338
302-422-3859

Alutech United, Inc.
James Rodrigue
PO Box 329
Selbyville, DE 19975

CERTIFICATE

Final Inspection Date:	11/10/2017
Application #:	041311
Owner:	Harry Hallock
Customer Job #:	
Occupancy:	Solar
Location:	33145 W. Batten Street, Lewes, Sussex Co., DE



This certifies that the installation of electrical equipment listed on referenced application has been approved as meeting the requirements of the National Electric Code, utility, municipalities and Agency rules. Any modification, addition or alteration of the electrical system, after the date of final inspection, will require a new application for inspections and certifications.

Robert Smith

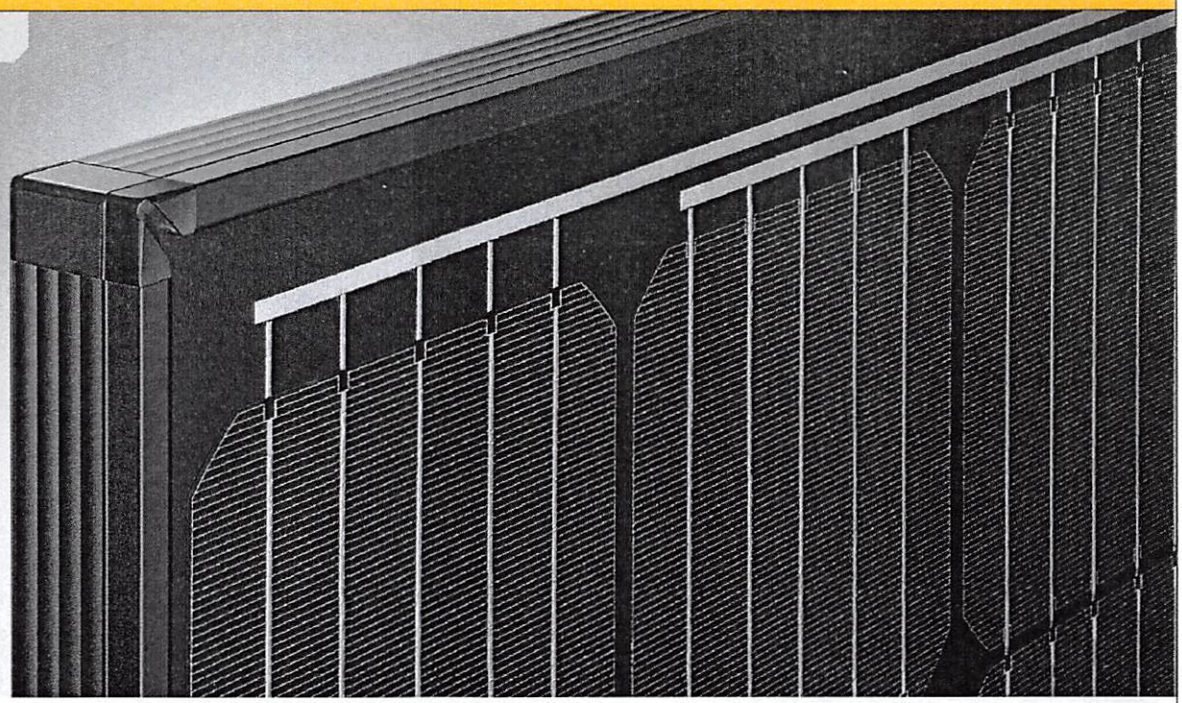
Chief Electrical Inspector

F.S. CERT

Sunmodule® Plus
SW 285 - 290 MONO BLACK

SOLARWORLD
REAL VALUE

Data sheet



QUALITY BY SOLARWORLD

SolarWorld's foundation is built on more than 40 years of ongoing innovation, continuous optimization and technology expertise. All production steps from silicon to module are established at our production sites ensuring the highest possible quality for our customers. Our modules come in a variety of different sizes and power, making them suitable for all global applications – from residential solar systems to large-scale power plants.

- Elegant aesthetic design–entirely black solar module, from the cells and frame to the module corners
- Extremely tough and stable, despite its light weight – able to handle loads up to 178 psf (8.5 kN/m²)
- Tested in extreme weather conditions – hail-impact tested and resistant to salt spray, frost, ammonia, dust and sand
- Proven guarantee against hotspots and PID-free to IEC 62804-1
- SolarWorld Efficells™ for the highest possible energy yields
- Patented corner design with integrated drainage for optimized self-cleaning
- High-transmissive glass with anti-reflective coating
- Long-term safety and guaranteed top performance – 25-year linear performance warranty; 20-year product warranty

MADE IN USA
OF US & IMPORTED PARTS

VDE
Quality Tested
ID. 40045046

www.solarworld.com

Sunmodule® Plus
SW 285 - 290 MONO BLACK

SOLARWORLD
REAL VALUE

PERFORMANCE UNDER STANDARD TEST CONDITIONS (STC)*

		SW 285	SW 290
Maximum power	P_{max}	285 Wp	290 Wp
Open circuit voltage	V_{oc}	39.2 V	39.5 V
Maximum power point voltage	V_{mpp}	32.0 V	32.2 V
Short circuit current	I_{sc}	9.52 A	9.60 A
Maximum power point current	I_{mpp}	9.00 A	9.12 A
Module efficiency	η_m	17.0 %	17.3 %

Measuring tolerance (P_{max}) traceable to TUV Rheinland: +/- 2% (TUV Power controlled, ID 0000039351) *STC: 1000W/m², 25°C, AM 1.5

PERFORMANCE AT 800 W/m², NOCT, AM 1.5

		SW 285	SW 290
Maximum power	P_{max}	214.8 Wp	220.0 Wp
Open circuit voltage	V_{oc}	36.2 V	36.6 V
Maximum power point voltage	V_{mpp}	29.5 V	29.9 V
Short circuit current	I_{sc}	7.80 A	7.86 A
Maximum power point current	I_{mpp}	7.27 A	7.37 A

Minor reduction in efficiency under partial load conditions at 25 °C: at 200 W/m², 97% (+/-3%) of the STC efficiency (1000 W/m²) is achieved.

PARAMETERS FOR OPTIMAL SYSTEM INTEGRATION

Power sorting	-0 Wp / +5 Wp
Maximum system voltage SC II / NEC	1000 V
Maximum reverse current	25 A
Number of bypass diodes	3
Operating temperature	-40 to +85 °C
*Maximum design loads (Two rail system)**	113 psf downward, 64 psf upward
*Maximum design loads (Three rail system)**	178 psf downward, 64 psf upward

*Please refer to the Sunmodule installation instructions for the details associated with these load cases.

COMPONENT MATERIALS

Cells per module	60
Cell type	Monocrystalline PERC
Cell dimensions	6 in x 6 in (156 mm x 156 mm)
Front	Tempered safety glass with ARC (EN 12150)
Back	Multi-layer polymer backsheet, black
Frame	Black anodized aluminum
J-Box	IP65
Connector	PV wire (UL4703) with Amphenol UTX connectors
Module fire performance	(UL 1703) Type 1

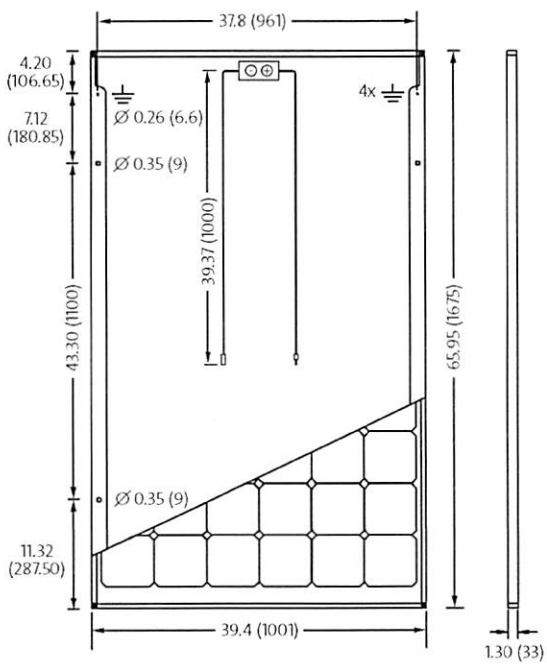
DIMENSIONS / WEIGHT

Length	65.95 in (1675 mm)
Width	39.40 in (1001 mm)
Height	1.30 in (33 mm)
Weight	39.7 lb (18.0 kg)

THERMAL CHARACTERISTICS

NOCT	46 °C
TC I_{sc}	0.07 %/C
TC V_{oc}	-0.29 %/C
TC P_{mpp}	-0.39 %/C

ISO 9001
ISO 14001
Certified



All units provided are imperial. SI units provided in parentheses.

ORDERING INFORMATION

Order number	*Description*
82000248	Sunmodule Plus SW 285 mono black
82000260	Sunmodule Plus SW 290 mono black

CERTIFICATES AND WARRANTIES

Certificates	IEC 61730	IEC 61215	UL 1703
	IEC 62716	IEC 60068-2-68	IEC 61701
Warranties	Product Warranty		20 years
	Linear Performance Guarantee		25 years

SolarWorld AG reserves the right to make specification changes without notice. This data sheet complies with the requirements of EN 50380.

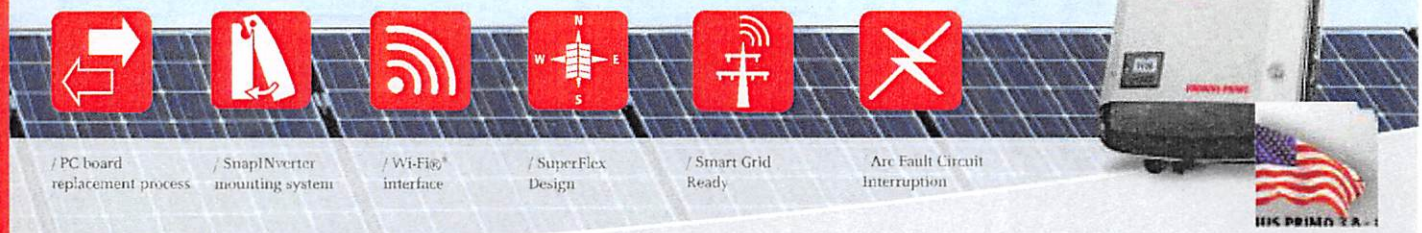
SW-01-7517US 20170201

/ Perfect Welding / Solar Energy / Perfect Charging

SHIFTING THE LIMITS

FRONIUS PRIMO

/ The future of residential solar is here - Introducing the new Fronius Primo.



/ PC board replacement process | / SnapINverter mounting system | / Wi-Fi® interface | / SuperFlex Design | / Smart Grid Ready | Arc Fault Circuit Interruption

/ With power categories ranging from 3.8 kW to 15.0 kW, the transformerless Fronius Primo is the ideal compact single-phase inverter for residential applications. The sleek design is equipped with the SnapINverter hinge mounting system which allows for lightweight, secure and convenient installation. The Fronius Primo has several integrated features that set it apart from competitors including dual powerpoint trackers, high system voltage, a wide input voltage range, Wi-Fi* and SunSpec Modbus interface, and Fronius' online and mobile monitoring platform Fronius Solar.web. The Fronius Primo also works seamlessly with the Fronius Rapid Shutdown Box for a reliable NEC 2014 solution** and offers a Revenue Grade Metering option completely integrated.

TECHNICAL DATA FRONIUS PRIMO

GENERAL DATA	FRONIUS PRIMO 3.8 - 8.2	FRONIUS PRIMO 10.0-15.0
Dimensions (width x height x depth)	16.9 x 24.7 x 8.1 in.	20.1 x 28.5 x 8.9 in.
Weight	47.29 lb.	82.5 lbs.
Degree of protection	NEMA 4X	
Night time consumption	< 1 W	
Inverter topology	Transformerless	
Cooling	Variable speed fan	
Installation	Indoor and outdoor installation	
Ambient operating temperature range	-40 - 131°F (-40 - 55°C)	-40 - 140°F (-40 - 60°C)
Permitted humidity	0 - 100 %	
DC connection terminals	4x DC+ and 4x DC- screw terminals for copper (solid / stranded / fine stranded) or aluminum (solid / stranded)	4x DC+1, 2x DC+2 and 6x DC- screw terminals for copper (solid / stranded / fine stranded) or aluminum (solid / stranded)
AC connection terminals	Screw terminals 12 - 6 AWG	
Revenue Grade Metering	Optional (ANSI C12.1 accuracy)	
Certificates and compliance with standards	UL 1741-2010, UL1998 (for functions: AFCI and isolation monitoring), IEEE 1547-2003, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Part 15 A & B, NEC Article 690, C22. 2 No. 107.1-01 (September 2001) , UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013	UL 1741-2015, UL1998 (for functions: AFCI, RCMU and isolation monitoring), IEEE 1547-2003, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Part 15 A & B, NEC Article 690-2014, C22. 2 No. 107.1-01 (September 2001) , UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013

PROTECTIVE DEVICES	STANDARD WITH ALL PRIMO MODELS
AFCI & 2014 NEC Ready	Yes
Ground Fault Protection with Isolation Monitor Interrupter	Yes
DC disconnect	Yes
DC reverse polarity protection	Yes

INTERFACES	STANDARD WITH ALL PRIMO MODELS
Wi-Fi*/Ethernet/Serial	Wireless standard 802.11 b/g/n / Fronius Solar.web, SunSpec Modbus TCP, JSON / SunSpec Modbus RTU
6 inputs or 4 digital inputs/outputs	External relay controls
USB (A socket)	Datalogging and/or updating via USB
2x RS422 (RJ45 socket)	Fronius Solar Net, interface protocol
Datalogger and Webserver	Included

*The term Wi-Fi® is a registered trademark of the Wi-Fi Alliance.

**Fronius Primo 10.0-15.0 kW requires an external disconnect button for code compliance.

TECHNICAL DATA FRONIUS PRIMO

INPUT DATA	PRIMO 3.8-1	PRIMO 5.0-1	PRIMO 6.0-1	PRIMO 7.6-1	PRIMO 8.2-1
Recommended PV power (kWp)	3.0 - 6.0 kW	4.0 - 7.8 kW	4.8 - 9.3 kW	6.1 - 11.7 kW	6.6 - 12.7 kW
Max. usable input current (MPPT 1/MPPT 2)	18 A / 18 A	18 A / 18 A	18 A / 18 A	18 A / 18 A	18 A / 18 A
Total max. DC current			36 A		
Max. array short circuit current (1.25 Imax) (MPPT 1/MPPT 2)			22.5 A / 22.5 A		
Operating voltage range			80 V - 600 V		
Max. input voltage			600 V		
Nominal input voltage	410 V	420 V	420 V	420 V	420 V
Admissable conductor size DC			AWG 14 - AWG 6		
MPP Voltage Range	200 - 480 V	240 - 480 V	240 - 480 V	250 - 480 V	270 - 480 V
Number of MPPT			2		

OUTPUT DATA		PRIMO 3.8-1	PRIMO 5.0-1	PRIMO 6.0-1	PRIMO 7.6-1	PRIMO 8.2-1
Max. output power	240 V	3800 W	5000 W	6000 W	7600 W	8200 W
	208 V	3800 W	5000 W	6000 W	7600 W	7900 W
Max. continuous output current	240 V	15.8 A	20.8 A	25.0 A	31.7 A	34.2 A
	208 V	18.3 A	24.0 A	28.8 A	36.5 A	38.0 A
Recommended OCPD/AC breaker size	240 V	20 A	30 A	35 A	40 A	45 A
	208 V	25 A	30 A	40 A	50 A	50 A
Max. Efficiency		96.7 %	96.9 %	96.9 %	96.9 %	97.0 %
CEC Efficiency	240 V	95.0 %	95.5 %	96.0 %	96.0 %	96.5 %
Admissable conductor size AC				AWG 14 - AWG 6		
Grid connection				208 / 240 V		
Frequency				60 Hz		
Total harmonic distortion				< 5.0 %		
Power factor (cos $\varphi_{ac,r}$)				0.85-1 ind./cap		

INPUT DATA	PRIMO 10.0-1	PRIMO 11.4-1	PRIMO 12.5-1	PRIMO 15.0-1
Recommended PV power (kWp)	8.0 - 12.0 kW	9.1 - 13.7 kW	10.0 - 15.0 kW	12.0 - 18.0 kW
Max. usable input current (MPPT 1/MPPT 2)		33.0 A / 18.0 A		
Total max. DC current		51 A		
Max. array short circuit current (1.25 Imax) (MPPT 1/MPPT 2)		41.3 A / 22.5 A		
Operating voltage range		80 V - 600 V		
Max. input voltage		600 V		
Nominal input voltage	415 V	420 V	425 V	440 V
Admissable conductor size DC	AWG 14 - AWG 6 copper direct, AWG 6 aluminum direct (AWG 10 copper or AWG 8 aluminium for overcurrent protective devices up to 60A, from 61 to 100A minimum AWG 8 for copper or AWG 6 aluminium has to be used), AWG 4 - AWG 2 copper or aluminum with optional input combiner			
MPP Voltage Range	220 - 480 V	240 - 480 V	260 - 480 V	320 - 480 V
Integrated DC string fuse holders	4- and 4+ for MPPT 1 / no fusing required on MPPT 2			
Number of MPPT	2			

OUTPUT DATA		PRIMO 10.0-1	PRIMO 11.4-1	PRIMO 12.5-1	PRIMO 15.0-1
Max. output power	240 V	9995 W	11400 W	12500 W	15000 W
	208 V	9995 W	11400 W	12500 W	13750 W
Max. continuous output current	240 V	41.6 A	47.5 A	52.1 A	62.5 A
	208 V	48.1 A	54.8 A	60.1 A	66.1 A
Recommended OCPD/AC breaker size	240 V	60 A	60 A	70 A	80 A
	208 V	70 A	70 A	80 A	90 A
Max. Efficiency			96.7 %		
CEC Efficiency			96.0 %		96.5 %
Admissable conductor size AC		AWG 10 - AWG 2 copper (solid / stranded / fine stranded)(AWG 10 copper or AWG 8 aluminium for overcurrent protective devices up to 60A, from 61 to 100A minimum AWG 8 for copper or AWG 6 aluminium has to be used) , AWG 6 - AWG 2 copper(solid / stranded) MultiContactWiringable with AWG 12			
Grid connection			208 / 240 V		
Frequency			60 Hz		
Total harmonic distortion			< 2.5 %		
Power factor (cos $\varphi_{ac,r}$)			0-1 ind./cap.		

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005 May 2015 FN

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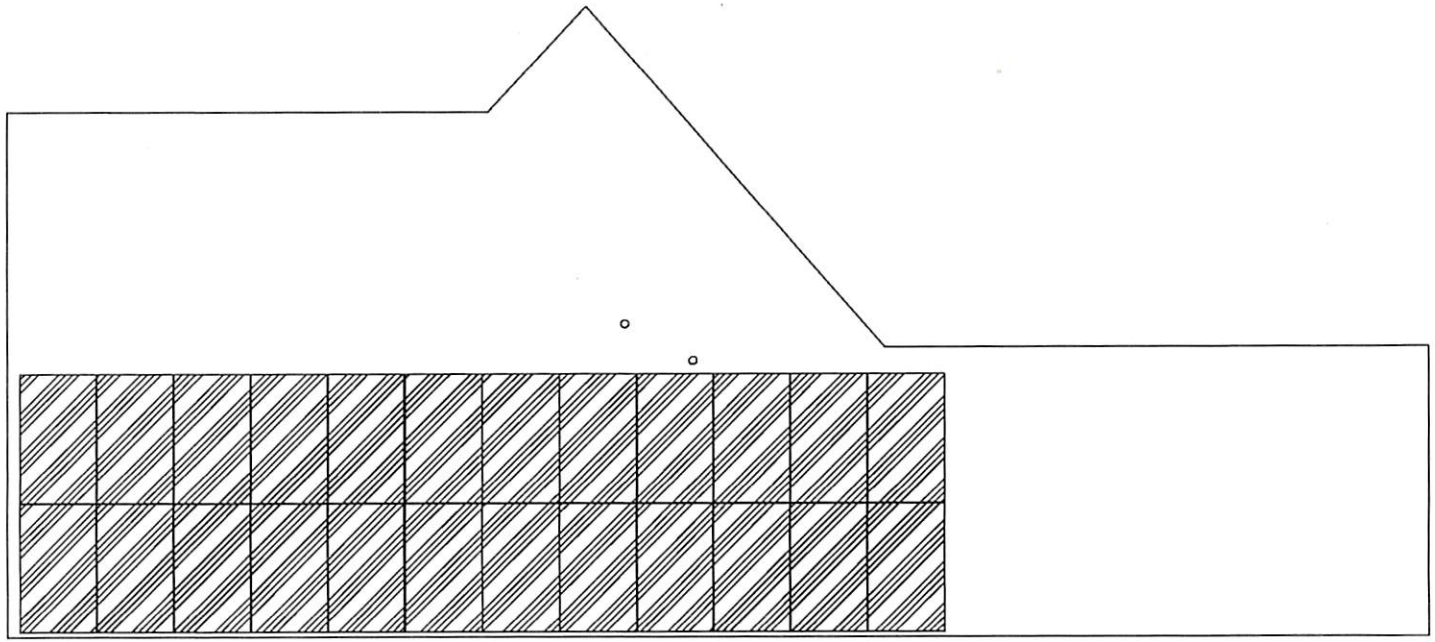


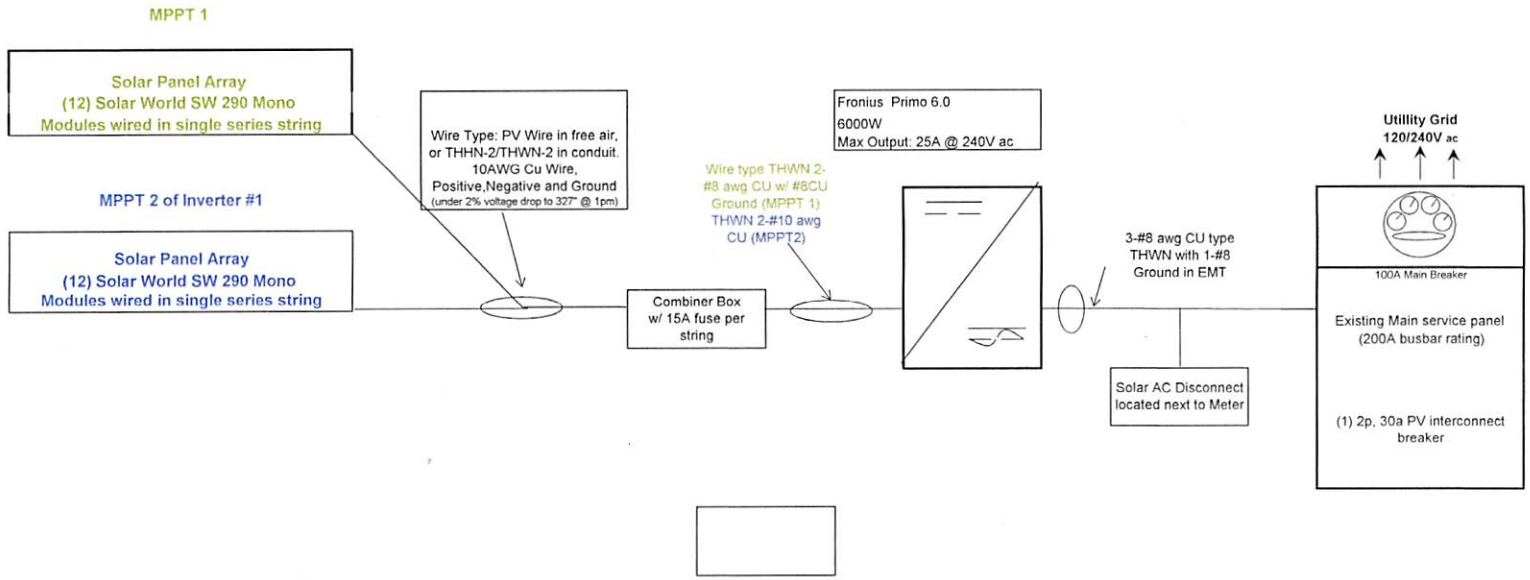
Harry Hallock
Potential Solar Layout
24 x SolarWorld 290w All Black
6.96 kW Array

NABCEP CERTIFIED
PV Installation Professional
Russell Pfaller
Cert # PV-041115-010261

green street solar
making delmarva greener...
one street at a time

Solar Module Specs:	
Solar World SW290 Mono	
Pm=	290
Voc=	39.5V
Vpm=	32.2V
Isc=	9.60A
Ipm=	9.12A
Series Fuse=	15A

SYSTEM SPECS:	
String Voc=	474v
String Vpm=	386v
String Isc=	9.6a
String Imp=	9.12a
# of Strings	2
Rated System V=	386v
Rated System I=	18.24a
Maximum System V=	474v
Maximum System I=	19.2a



2- String Panel System
System Capacity:6.96 kW DC

302-249-455

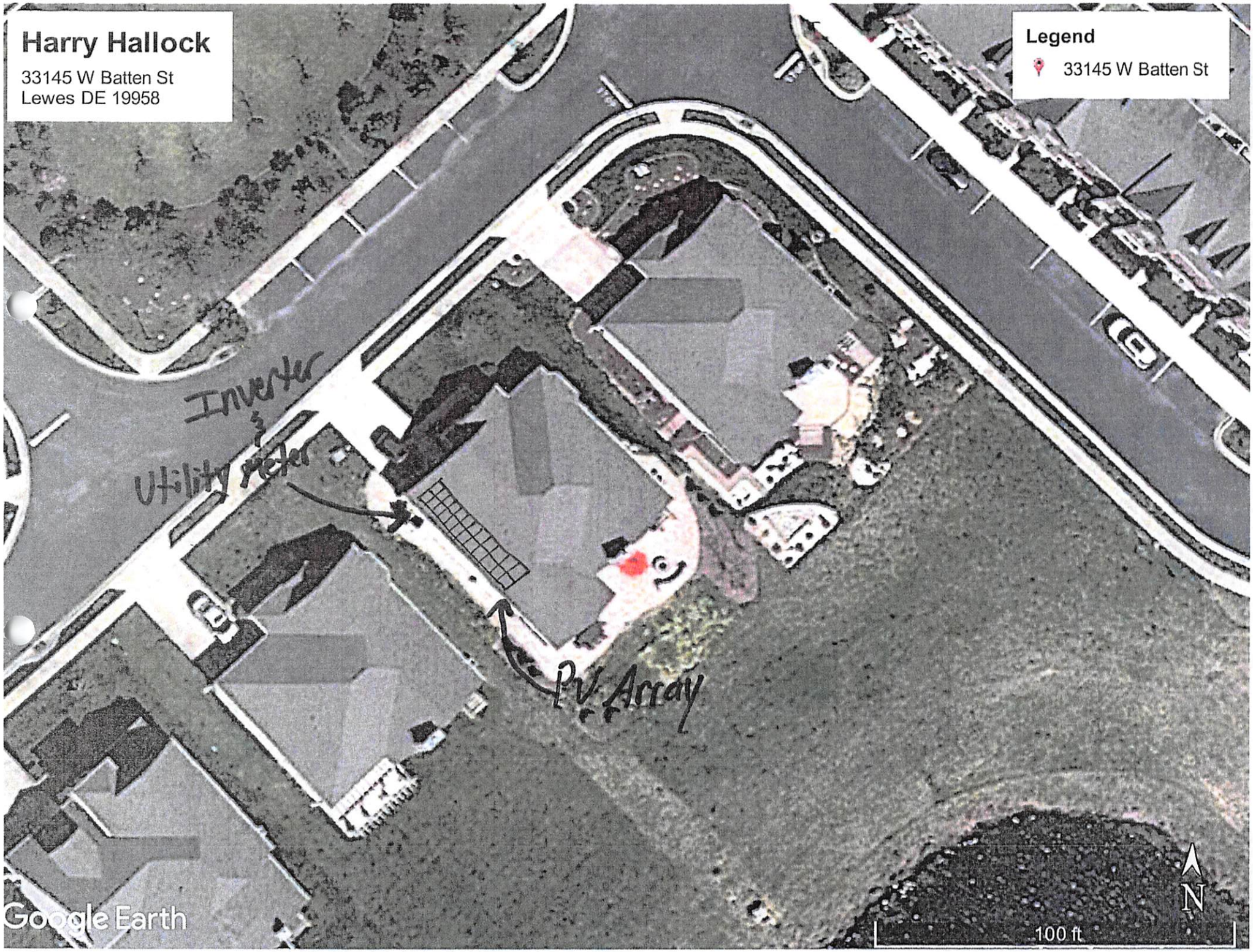
green street solar

15 Dixon Street
Selbyville, Delaware 19975
Phone: 302-436-6005
Fax: 302-436-5100
web: www.greenstreetsolar.com

Project:
Hallock Project

Date:
9/25/2017

System Type:
Grid-Tied PV System


Harry Hallock
33145 W Batten St
Lewes DE 19958
Legend
33145 W Batten St
Inverter
Utility meter
P.V. Array
Google Earth
100 ft
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